Summary of Local, State and Federal Vapor Intrusion Guidance (Challenges, Set Backs and Path Forward)

The SAM Fall Forum

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Speakers

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Soil Vapor Surveys are generally used for two different purposes

- **Identify the horizontal distribution of contamination to refine future investigations**
- **Collection of soil gas to be used in health risk evaluations**

Use to identifying horizontal distribution of contamination

Use of passive soil gas sampling

- Provides qualitative results
- Used at sites where little is known about the source location.
- Requires placement in a grid pattern
- Where residual groundwater or soil contamination is likely to be shallow
- Sampling occurs one time at a single shallow depth

Use of active soil gas sampling

- Provides quantitative results
- Used at sites where the subsurface geology is understood and the depth of contamination is either shallow or deep.
- Sample locations are more authoritative
- Sampling occurs one or more times but possibly at multiples depths

Collection of Soil Gas for Health Risk

- **Installation of permanent sample probes (Probe in ground more than 24-hours)**
- **Sampling at more than one depth (dependent on depth of residual source)**
- **Sampling multiple events**
- **Must have a good understanding of the subsurface geology/stratigraphy**
- **Must have a good understating of the distribution of contamination**

Collection of Soil Gas for Health Risk (Continued)

Soil's physical properties

- **The modeled vapor pathway must address the heterogeneous characteristics of the soil media.**
- **The preferred vapor pathway will be that of the soils with the highest permeability and lowest moisture content.**
- **A sufficient number of soil samples should be taken to address the variability of the soil**
- **Numerical averaging of soil properties in most cases is not appropriate.**

Collection of Soil Gas for Health Risk (Continued)

Vapor Sample Size

- Use of syringes (60 cc) – Preferred for in-situ soil gas samples
- Suma Canister (500 cc) – Acceptable for sub-slab samples
- Suma Canister (1 liter to 15 liters) – Such excessive volume is discouraged

Leak Testing

- To evaluate ambient air intrusion from the surface (probe integrity)
- To evaluate ambient air intrusion from the sampling equipment.
- Use of tracer VOCs or inert gases (ie: helium)

Collection of Soil Gas for Health Risk (Continued)

VOCs

- Benzene
- Toluene
- Ethyl benzene
- Xylene
- MTBE
- TBA
- Napthalene

HVOCs

- PCE
- TCE
- TCA

Collection of biogenic gases

- Oxygen (O_2)
- Carbon Dioxide (CO_2)
- Methane (CH_4)

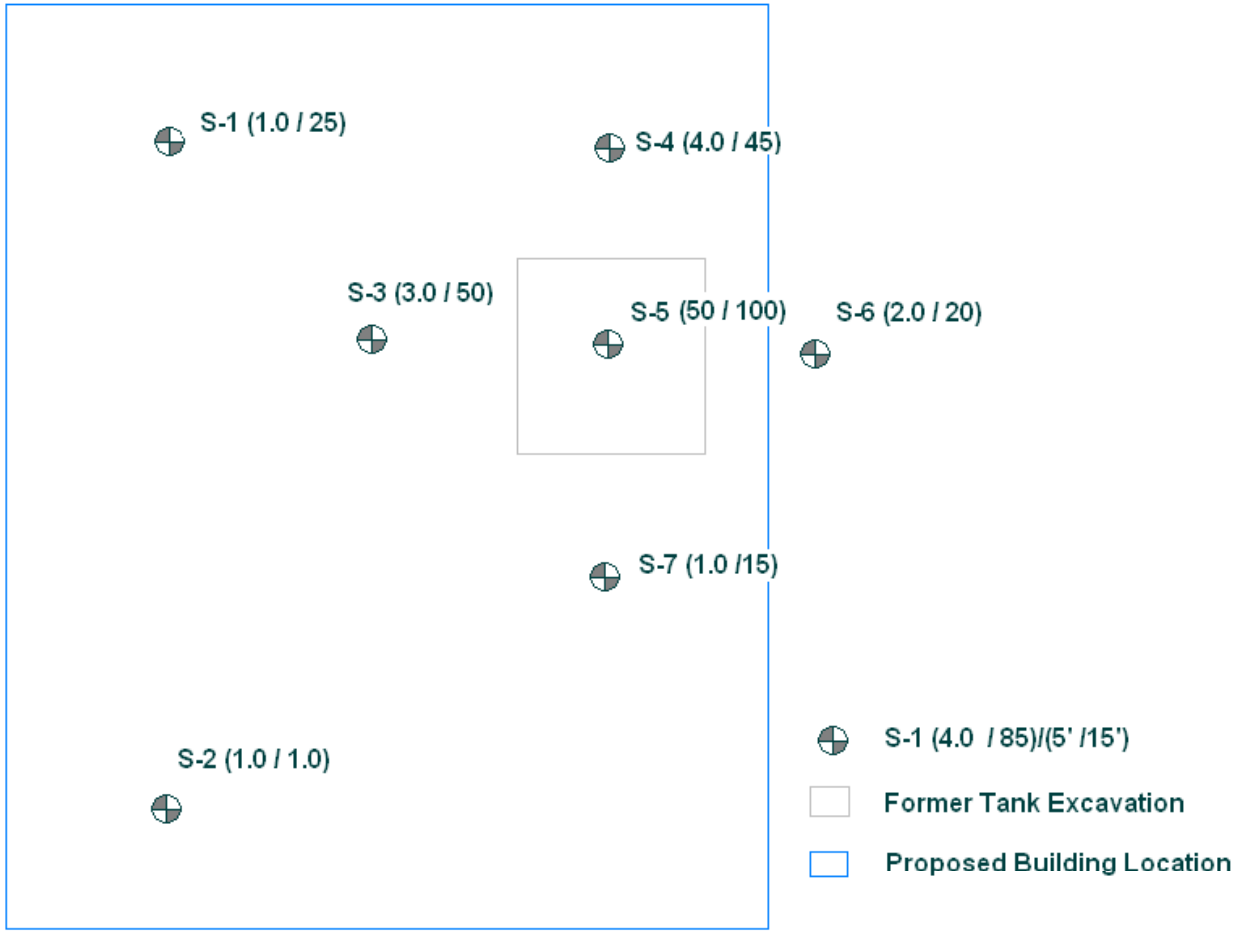
Collection of Soil Gas for Health Risk (Continued)

- **Use of default values vs. measured values**
- **SAM Manual Guidance vs. Company In-house Guidance**
- **Vapor Risk 2000 vs. DTSC-J&E Model vs. EPA-J&E Model**

Integration of Field Data into Risk Evaluation

- **Use of highest value**
  - **Tier 1 evaluation**

Highest Value



Concentration

@5' = 50 ug/l

@15' = 100 ug/l

Risk

@5' = 10E-6

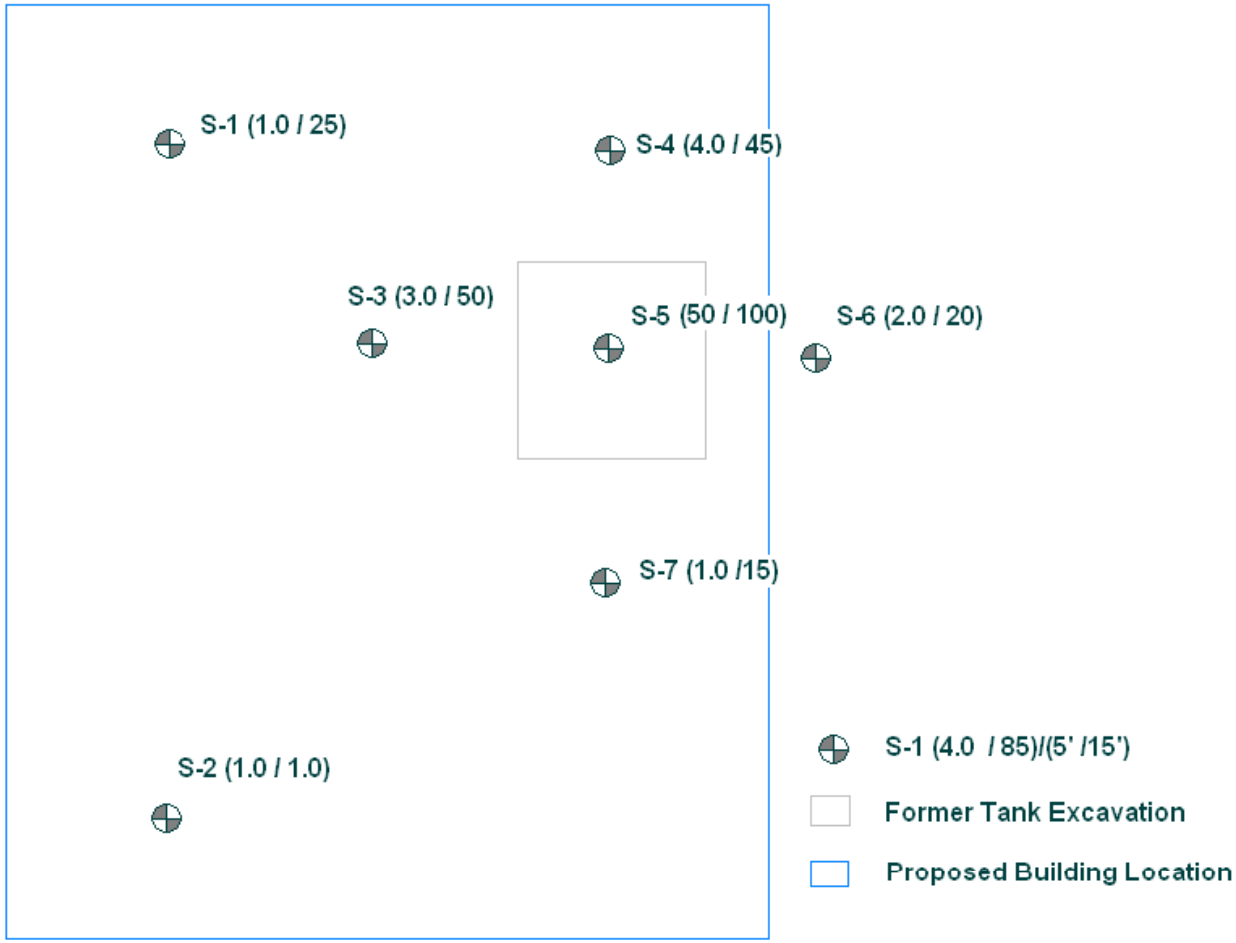
@15' = 7E-6

Integration of Field Data into Risk Evaluation

- Use of highest value

- **Numerical averaging measured values**
  - **Tier 2 evaluation**
  - **Generally uniform distribution of vapors below the existing or proposed structures**

Numerical Average



Concentration

@5' = 8.9 ug/l

@15' = 36.6 ug/l

Risk

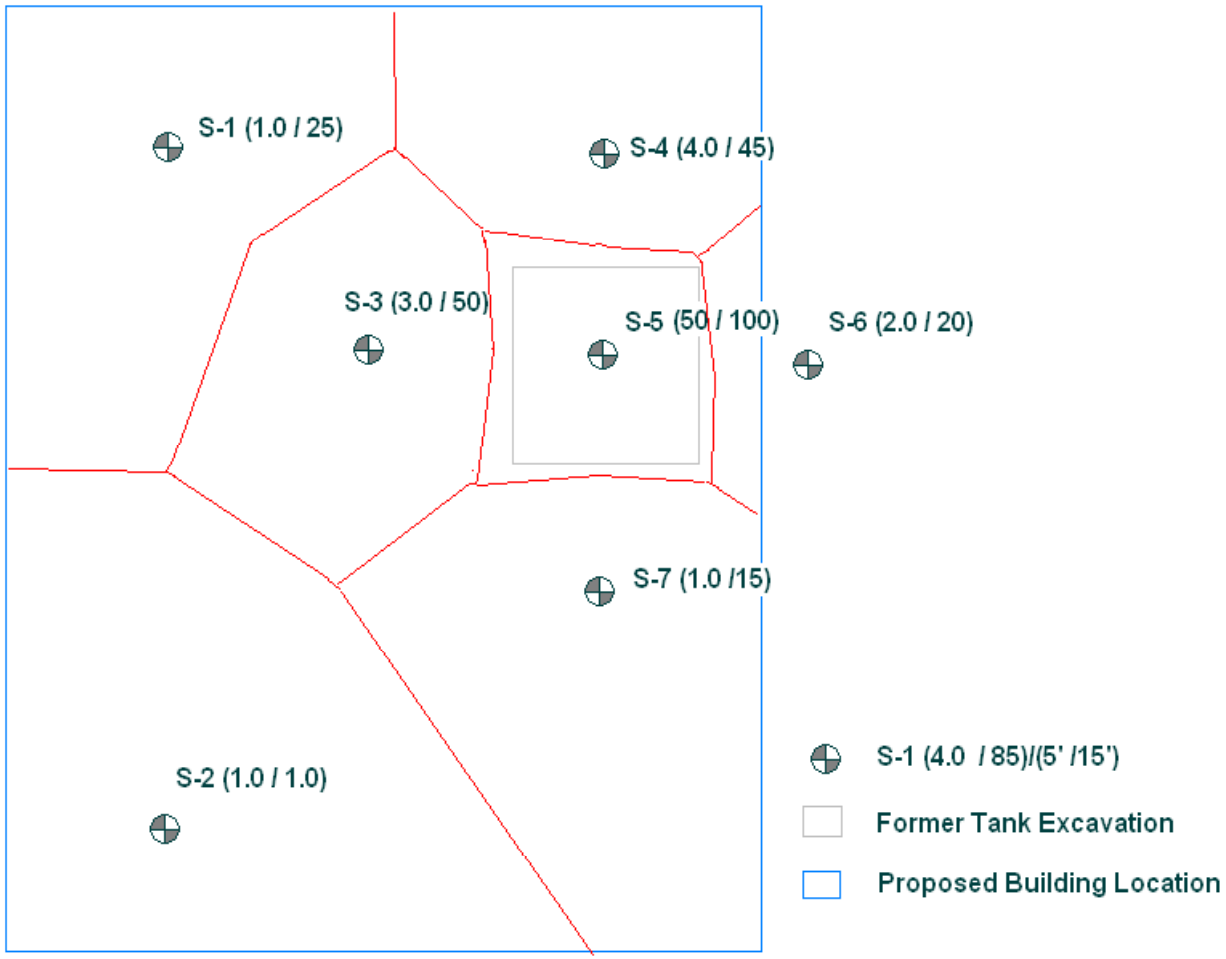
@5' = 2E-6

@15' = 3E-6

Integration of Field Data into Risk Evaluation

- Use of highest value
- Numerical averaging measured values
- **Weighted averaging of measured values**
  - **Tier 2 evaluation**
  - **Generally non-uniform distribution of vapors below the existing or proposed structures.**

Weighted Average



Concentration

@5' = 5.4 ug/l

@15' = 28.4 ug/l

Risk

@5' = 1E-6

@15' = 2E-6